APPENDIX C

GLOSSARY OF TERMS AND ABBREVIATIONS

actinides
The radioactive elements with atomic number of 89 through 103. The name is taken from actinium, the first member of the series.

activation
The process of making a material radioactive by bombardment with neutrons, protons, or other nuclear particles.

activity
A measure of the rate at which radioactive material is emitting radiations; usually given in terms of the number of nuclear disintegrations occurring in a given quantity of material over a unit of time. The standard unit of activity is the curie (Ci).

AEC
Atomic Energy Commission (discontinued with formation of ERDA and NRC on January 19, 1975).

alpha particle (α)
A positively charged particle emitted by certain radioactive materials. It is made up of two neutrons and two protons; hence, it is identical with the nucleus of a helium atom.

aquifer
A water-bearing layer of permeable rock or soil.

background radiation
The varying radiation of man's natural environment. It results from cosmic rays and from the naturally radioactive elements of the earth, including those within man's body.

biota
The animal and plant life of a region.

burial ground
An area specifically designated for the shallow subsurface disposal of solid radioactive wastes.

cal
Calories.

calcine
Material heated to a temperature below its melting point to bring about loss of moisture and oxidation to a chemically stable form.

Note: Many of these terms are given special definitions to refer to their specific use in this statement.

canyon building
A heavily shielded building used in the chemical processing of irradiated fuel and target elements. Operation and maintenance are by remote control.

cask
A container that provides shielding and containment during transportation of radioactive material. The shielding is normally lead and/or steel, or uranium.

cc
Cubic centimeters (1 cc = 1 mL).

cfm
Cubic feet per minute.

cfs
Cubic feet per second.

CG
Concentration Guide.

Ci
Curies.

concentration guide
The average concentration of a radionuclide in air or water to which a worker or member of the general population may be continuously exposed without exceeding radiation dose standards. (Usually 50 years or until biological equilibrium is reached.)

CRC
Cesium Removal Column, a deionizer used to remove ^{137}Cs ions from evaporator condensate.

curie
The basic unit used to describe the intensity of radioactivity in a sample of material. One curie (Ci) equals 37 billion disintegrations per second.

decay
The spontaneous radioactive transformation of one nuclide into a different nuclide or into a different energy state of the same nuclide. Every decay process has a definite half-life.

decommissioning
Decommissioning operations remove facilities such as reprocessing plants, waste tanks, and burial grounds from service and reduce or stabilize radioactive contamination. Decommissioning concepts include:

- Decontaminate, dismantle and return area to original conditions without restrictions.
- Partially decontaminate, isolate remaining residues, and continue surveillance and restrictions.

deionizer
A vessel containing ion exchange resins, used for removing positively or negatively charged ions from liquid.

DF
Decontamination factor, the ratio of the concentration of a constituent in the feed stream to that in the treated effluent.

Diatometer
An instrument to measure the concentration of microscopic diatoms in water as an index of water quality.

disposal (of radioactive waste)
Operations designed to eliminate wastes from existence on earth or permanently isolate them from mankind and his environs with no expectation of retrieval after emplacement. Isolation concepts include:

- Placement in subsurface geologic formation using technologies that offer no practical method for recovery.
- Emplacement into or beneath sea floors.
- Emplacement in ice sheets.

Elimination concepts include extraterrestrial disposal and transmutation.

dose
The energy imparted to matter by ionizing radiation per unit mass of irradiated material at a specific location. The unit of absorbed dose is the rad.

eluate
The liquid resulting from removing the trapped material from an ion exchange resin.

ERDA
Energy Research and Development Administration (the nuclear program components of ERDA were formerly part of the AEC). Became part of the Department of Energy established October 1, 1977.

final storage
Storage operations for which 1) no subsequent waste treatment or transportation operations are anticipated, and 2) conversion to disposal is considered possible.

fission products
Nuclei formed by the fission of heavy elements. Many are radioactive. Examples: strontium-90, cesium-137.

flocculent
Noncrystalline (wooly, cloudy, flakelike) particles suspended in a liquid. Such particles are caused by addition of a flocculating agent to a liquid, and can then be filtered out of the liquid.

FRC
Federal Radiation Council (now part of EPA).

gal
Gallons.

g/L
Grams per liter.

gpm
Gallons per minute.

ground water
Water in the zone of saturated aquifer beneath the land surface.

half-life, biological
The time required for a living organism to eliminate, by natural processes, half the amount of a substance that has entered it.

half-life, radiological
The time in which half the atoms in a radioactive substance disintegrates.

HHW
High heat waste (high-level liquid waste that requires auxiliary cooling).

HEPA
High efficiency particulate air filter. A type of filter designed to remove 99.9% of the particles down to 0.3 μm in diameter from a flowing air stream.

high-heat liquid waste
Liquid waste containing sufficient thermal energy to require some supplemental means of cooling, such as cooling coils.

high-level liquid waste
The aqueous waste resulting from the operation of the first-cycle extraction system, or equivalent concentration wastes from subsequent extraction cycles, or equivalent wastes from a process not using solvent extraction, in a facility for processing irradiated reactor fuels.

high-level waste
(a) high-level liquid waste, or (b) the products from solidification of high-level liquid waste, or (c) irradiated fuel elements, if discarded without processing.

ICRP
International Commission on Radiological Protection.

ICPP
Idaho Chemical Processing Plant, near Idaho Falls.

interim storage

Storage operations for which 1) monitoring and human control are provided, and 2) subsequent action involving treatment, transportation, or final disposition is expected.

Concepts for interim storage include bulk and unitized storage of solid, liquid, and gaseous wastes.

Alternative interim storage technologies include:

- Tank storage of liquids
- Canister storage in air-cooled vaults
- Spent fuel storage in water basins.

ion exchange

A reversible chemical reaction between a solid and a fluid mixture by means of which ions may be interchanged.

isolation

A term encompassing both final storage and/or disposal in geologic formations.

km

Kilometers (1 kilometer = 1000 meters or 0.621 mile)

LHW

Low-heat waste (high-level liquid waste that does not require auxiliary cooling but may contain significant quantities of radionuclides).

long-lived nuclides

Radioactive isotopes with half-lives greater than about 30 years. Most long-lived nuclides of interest to waste management have half-lives on the order of thousands to millions of years (^{239}Pu - 24,400 years; ^{99}Tc - 2.1×10^5 years; ^{129}I - 1.7×10^7 years).

M

Molar.

m

- Meter.
- As prefix — see "milli."

man-rem

The total radiation dose commitment to a given population group; the sum of individual doses received by a population segment.

mg

Milligrams.

Micro (μ)

Prefix indicating one millionth (1 microgram = 1/1,000,000 of a gram or 10^{-6} gram).

mil
One thousandth of an inch.

milli
Prefix indicating one thousandth.

mL
Milliliters.

MM
Modified Mercalli (scale of earthquake intensities).

mol
Mole — the amount of a substance that has a weight numerically equal to the molecular weight of the substance.

molar
Designation of the concentration of a solute in a solution [a solution that is 1.0 molar (1.0M) in NaOH contains 1.0 mol of NaOH per liter].

mph
Miles per hour.

mR
Milliroentgen.

mrem
Millirems.

nano
Prefix indicating one thousandth of a micro unit (1 nanocurie = 1/1000 of a microcurie or 10^{-9} curie).

natural uranium
Uranium as found in nature. It is a mixture of the fertile uranium-238 isotope (99.3%), the fissionable uranium-235 isotope (0.7%), and a minute percentage of uranium-234.

nCi
Nanocuries.

NCRP
National Council on Radiation Protection and Measurements.

noble gas
A chemically inert gas; e.g., xenon, argon, and krypton.

NRC
Nuclear Regulatory Commission (formerly part of AEC).

nuclide
Any atomic nucleus specified by its atomic weight, atomic number, and energy state. A radionuclide is a radioactive nuclide.

overpack
Secondary (or additional) external containment for packaged nuclear waste.

PNL
Pacific Northwest Laboratories, Richland, Washington.

pCi
Picocuries.

pH
A measure of the hydrogen ion concentration in aqueous solutions. Acidic solutions have a pH from zero to 7. Basic solutions have a pH from 7 to 14.

pico
Prefix indicating one millionth of a micro unit (1 picocurie = 1/1,000,000 of a microcurie or 10^{-12} curie).

piezometer
A well used for measuring the water pressure, or head, of subsurface aquifers.

plant stream
Any natural stream on the SRP site. Surface drainage of the site is via these streams to the Savannah River.

ppm
Parts per million.

ppb
Parts per billion.

psi
Pounds per square inch.

radioactivity
The spontaneous decay or disintegration of unstable atomic nuclei, accompanied by the emission of radiation.

radionuclide
An unstable nuclide of an element that decays or disintegrates spontaneously, emitting radiation.

rem
A quantity used in radiation protection to express the effective dose equivalent for all forms of ionizing radiation. It is the product of the adsorbed dose in rads and factors related to relative biological effectiveness.

repository
A location containing wastes in storage or disposal.

resin
An organic polymer. It is used in the text to refer to synthetic ion exchanger materials.

retention basin
An excavation, either lined with an impermeable material or unlined, to receive aqueous streams for temporary storage. Retention basins are used when necessary for temporary storage of cooling water or storm drainage that might be contaminated. After sampling, this water may be processed further or transferred to a seepage basin or an onsite stream.

seepage basin
An excavation in the ground to receive aqueous streams containing chemical and radioactive wastes. The water evaporates or seeps from the basin through the soil column to the ground water and ultimately to the streams that drain the plantsite. Insoluble materials settle out on the floor of the basin. Soluble radioactive materials move with the water or are removed by ion exchange with the soil. Seepage basins are surrounded by earthen dikes to prevent the entrance of surface water, and levels are controlled to prevent overflow from the basin system.

seismicity
The tendency for the occurrence of earthquakes.

separations
Chemical processes used to separate nuclear products from byproducts and from each other.

short-lived nuclides
Radioactive isotopes with half-lives no greater than about 30 years; e.g., ^{137}Cs and ^{90}Sr.

solidification
Conversion of radioactive waste to a dry, stable solid.

SRP
Savannah River Plant.

SRL
Savannah River Laboratory.

steam jet
A device to move liquids from one place to another by suction and entrainment in moving steam.

stress corrosion
Chemical corrosion that is accelerated by stress concentrations.

supernate
That portion of high activity liquid waste that contains fission products (primarily ^{137}Cs) in solution. Other portions are the insoluble sludge and crystallized salt.

tank farm
An installation of interconnected underground tanks for the storage of radioactive high-level liquid wastes.

transuranium elements
Elements above uranium in the periodic table; that is, with an atomic number greater than 92. All 13 known transuranium elements are radioactive and are produced artificially. Examples: neptunium, plutonium, curium, californium.

transuranic waste
Any waste material measured or assumed to contain more than a specified concentration (e.g., presently 10 nanocuries of transuranium activity per gram of waste) of transuranic elements.

USGS
United States Geological Survey.

waste, radioactive
Equipment and materials (from nuclear operations) that are radioactive or have radioactive contamination and for which there is no recognized use or for which recovery is impractical.

water table
The upper surface of the ground water.

zeolite
Any of various hydrous silicates that can act as ion exchangers.

μ
Mu, a prefix — same as "micro."

μ*Ci*
Microcuries.

μ*g*
Micrograms.

μ*m*
Micrometers.

*U.S. GOVERNMENT PRINTING OFFICE : 1979 0-310-912/138